Cleanout work begins in two major PFP production facilities

Michele Gerber, *Fluor Hanford*

A PFP nuclear chemical operator replaces a glove on glovebox HC-9B in the 234-5Z Building to prepare for removing plutonium hold-up.

Fluor Hanford workers have begun cleaning out “hold-up” plutonium-bearing material in two large buildings slated for deactivation and decommissioning (D&D) at the Plutonium Finishing Plant complex. Cleaning it out is one of the first steps in shifting work at PFP from material stabilization and packaging to D&D. When stabilization and packaging activities are finished in early 2004, all efforts at the plant will focus on D&D activities.

Hold-up material is that left in building systems such as gloveboxes, piping, process exhaust ducts, filters, sumps, pumps and other equipment. Up to 100 kilograms of hold-up material, mostly plutonium and americium, is estimated to exist throughout the various buildings of the PFP complex, with much of it residing in the main 234-5Z Building and in the Plutonium Reclamation Facility.

The U.S. Department of Energy decided that most of Hanford’s hold-up plutonium inventory, along with the systems and equipment to which it clings, will be packaged and disposed of as solid transuranic waste. Hold-up material containing higher concentrations of special nuclear material will be thermally stabilized, sealed into sturdy, tripled-layered “3013” cans and placed in the PFP storage vaults for eventual shipment off the site.

Cleanout a challenge

While the original baseline called for bringing the 61 buildings of the PFP complex down to slab-on-grade status by 2038, Fluor Hanford developed acceleration plans, in response to DOE’s request, to move the end date back to 2016 and then to 2009. Now, Fluor Hanford is trying to accomplish much of the D&D work even sooner. The company is concurrently removing hold-up in certain buildings, removing equipment in others and taking actions suited to different situations in the various structures.

In the 234-5Z and PRF facilities alone, D&D engineers and planners working under Fluor Hanford D&D director Bob Heineman have identified more than 120 locations with plutonium hold-up material in sufficient quantities to be recovered. Together, these facilities have more than 100,000 square feet of floor space. They have up to 10,000 linear feet of contaminated ductwork, thousands of feet of process and drain lines, vacuum and air ducts, filter boxes, process pumps and tanks, and other contaminated media. There are more than 200 contaminated gloveboxes and hoods — a hood being a generic term during early Hanford for several types of plutonium-handling equipment, sometimes including gloveboxes.

The 234-5Z structure, long known to Hanford workers as “Dash-5,”contains plutonium-bearing materials today because it served as a workhorse for the American nuclear defense complex for 40 years. It provided the final step in plutonium purification before the material was placed into weapons. Opened for business in 1949, Dash-5 was the first large-scale U.S. plutonium finishing plant. Over the years, it produced more plutonium metal than any other American facility, yielding output that was equivalent to that of DOE’s Rocky Flats and Savannah River sites combined.

In the early 1960s, the PRF was constructed to process various types of scrap left from the multifaceted plutonium handling and finishing steps that took place in Dash-5. Capturing and processing those scraps

Continued on page 5.

Cleanout work begins in two major PFP production facilities, cont.

reclaimed untold kilograms of plutonium that could be blended into the Dash-5 “feed streams” to yield plutonium metal for weapons. PRF was so successful, and combined so many scrap recovery processes under one roof, that the Atomic Energy Commission, the predecessor agency to DOE, chose it in 1972 as the headquarters for the federal Central Scrap Management Organization. The CSMO served the dozens of AEC nuclear production and research sites and some commercial facilities by recovering plutonium in forms and quantities well beyond those produced by Hanford facilities alone.

Unfortunately, the extensive processing took its toll on the PRF, and major facility breakdowns occurred within the CSMO’s first decade. Today, the remains of its extensive missions make PRF a D&D job of almost unpar- alleled complexity.

Fluor Hanford D&D teams inspect equipment in the 232-Z Incinerator as part of pre-cleanout planning.

Tackling ‘C’ Line gloveboxes

Teams under Mick Talbot, deactivation manager for the 234-5Z Building, began preparations for hold-up cleanout last fall. PFP workers have traveled to the Rocky Flats Site to gain insights into how to cut the time it takes to do cleanout work and lower dose rates to employees. “We’re interested in breakthroughs that can help us do our work safer, faster and cheaper,” said Talbot. “We’re looking at a huge D&D task here at PFP, and we want to work as smartly as we can.”

Returning to Hanford, the teams started removing hold-up material in HC-7C, a long, tall and narrow glovebox that is part of the historic Remote Mechanical “C” Line. This line is a 180-foot- long automated plutonium finishing and fabrication system installed in the 234-5Z Building in the mid-1950s as part of Hanford’s Cold War build-up. “We chose this box,” said Talbot, “because it presented straightforward challenges and served as a good opportunity for us to test our D&D concepts. Also, HC-7C did not present as great a contamination hazard to workers as will some other equipment.”

When pre-job walk-downs revealed that about a third of the bottom shielding around the HC-7C glovebox was missing, project engineer Brad Norman coordinated the design and installation of new leaded-plastic shielding to reduce radiological dose rates to workers. PFP maintenance teams capped piping leading to the glovebox to prevent liquids from inadvertently getting in, and modified electrical and mechanical systems as appropriate.

Then, teams of nuclear chemical operators, radiological control technicians, pipefitters, millwrights, electricians and others tackled the interior of HC-7C. They removed waste consisting of glass tanks, valves, agitators, piping and other equipment and placed it in 55-gallon containers. By the time the removal efforts were finished in April, they had logged valuable field experience to apply to the more challenging hold-up removal in other gloveboxes.

After conducting an extensive post-job review to identify lessons learned in the HC-7C tasks, Talbot’s crews began work this past spring on glovebox HC-9B, also part of the head end of the old “C” Line. HC-9B is more than 13 feet tall, has three interior levels packed with equipment and “sweeps” (loose contaminated material),

Continued on page 6.

and is estimated to contain more hold-up plutonium than HC-7C. “It has equipment that presents more challenges and a radiation dose that significantly complicates the work,” said legacy hold-up removal project manager Jim Lilly. “At the same time, it represents an important step in transitioning PFP, so working on it is exciting.”

Cleanout of HC-9B is expected to be completed late this year.

PRF cleanout begins

This past spring, cleanout crews under Leo Aranda began preparing to remove hold-up material in five large gloveboxes in the “miscellaneous treatment” area of the PRF. PRF is estimated to contain a third of all the hold-up material in the PFP complex.

Nuclear chemical operators Tony Clark, Donnie Lapierre and Shawn Wilson recently participated in re-gloving some of the glovebox ports in the miscellaneous treatment area, and started waste seal-outs in July. The work requires full personal protective clothing and is done under hot and cramped conditions. Further, everything had to be done by hand — without the use of electrical tools — to limit intrusive work on old equipment that hadn’t been fully analyzed using modern safety criteria.

However difficult the work was, Clark is positive about the effort because, he said, “The workers helped plan the job and review the criticality documentation, and managers listened to our suggestions. In this work, the entire team made an effort to link the people in the field with those preparing the paper. As a result, we have a very workable project.”

232-Z, 241-Z to start soon

At the same time that physical cleanout work is beginning in the 234-5Z and PRF facilities, Fluor Hanford teams are preparing to clean out the 232-Z Incinerator Building and the 241-Z Liquid Waste Storage Facility. That work is to begin in October.

The small 232-Z facility burned plutonium-bearing solid waste and then used an acid leachate system to retrieve plutonium from the ashes during the 1960s and 1970s. It still contains the huge “burning hood,” cyclone separators for the ashes, bricks, the old conveyor system and several grams of plutonium. DOE and Fluor Hanford plans call for demolishing the structure by 2006.

The 241-Z structure, which handled PFP’s liquid waste discharges for nearly 50 years, contains five below-grade cells with highly contaminated tanks, sumps, an agitator and piping. Cleaning out this facility presents special challenges because each of the cells is a confined space where work must be done wearing supplied-air respirators. Plans call for demolishing the 241-Z structures by 2007.

These two structures are on the leading edge of a large, fast-track D&D effort that will sweep through the PFP complex in the next few years. “We’re doing the planning and training as thoroughly as we can,” said Steve Norton, deactivation manager for both the 232-Z and 241-Z facilities. “We have talented and dedicated operators, radiological control technicians, crafts personnel and others who are working very hard in tackling this formidable work.” ■